Farmers, groups experiment with e-tractors

By GEORGE PLAVEN
Capital Press

DUFUR — The first time Robert Wallace started an electric tractor, he was astonished by how quiet it was.

"I didn't know if it was on or not," Wallace said. "It was the most mind-boggling thing. It took me probably two or three weeks to get used to, not having a constant rumble of noise."

Over the last year, Wallace has become well acquainted with the tractor as he used it to mow grass and perform other chores around his home near Dufur.

His demonstrations are part of a unique project in Oregon, field testing electric tractors in rural agricultural areas like Dufur and allowing producers to see firsthand what they can do on farms and in orchards.

Data from the trials were also used by Oregon State University in a newly released study comparing the cost of ownership for battery-powered electric tractors to their diesel counterparts. Early results indicate the cost may be comparable, depending on several factors, including the purchase price, fuel prices and maintenance costs.

Proponents of electric vehicles are quick to point out social and environmental benefits such as reducing carbon emissions that contribute to climate change. But Wallace said his main focus is simply learning how the technology stacks up for rural areas.

"I consider myself just a realist," he said. "I want to be able to say if it works, or if it doesn't work."

George Plaven/Capital Press

Robert Wallace, executive director of the Wy'East Resource Conservation and Development Area Council, demonstrates using a new Solectrac Compact Electric Tractor at his home in Dufur.

Inevitable transition

Wallace is executive director of the Wy'East Resource Conservation and Development Area Council, a regional nonprofit based in The Dalles dedicated to helping farms improve their energy and water efficiency.

As a certified energy manager, Wallace has spent most of the last decade working with growers to optimize their irrigation systems by installing more efficient pumps and sprinklers.

The electric tractor project came to Wallace from two other Oregon nonprofits — Sustainable Northwest, a renewable energy and natural resources conservation group, and Forth Mobility, which aims to expand access to electric vehicles and transportation.

Discussions started pre-pandemic, with the nonprofits interested in accelerating the adoption of electric farm machinery.

Bridget Callahan, senior energy program manager for Sustainable Northwest, said the transition to electrification is inevitable as more states adopt policies to curb fossil fuels.

Oregon legislators passed a law known as the Climate Protection Program late last year. It requires fuel suppliers in Oregon to reduce greenhouse gas emissions from the products they sell 50% by 2035 and 90% by 2050.

"Our idea is, we're seeing this rapid transformation. ... We know it's not going to look the same in rural parts of the state and Northwest," Callahan said. "How do we ensure major investments in electrification, and what does that look like in a rural context?"

Whitaker Jamieson, program manager at Forth Mobility, said they wanted to show the potential for electric tractors on farms.

"I think that's the key to the demonstration," Jamieson said. "You start to see heads turning, and people saying 'I need to start thinking about this for my farm.'"

A fourth project partner, the Bonneville Environmental Foundation, came aboard and provided funding to purchase one of the first two demonstration tractors.

The foundation works primarily with consumer-owned utilities in the Northwest that purchase hydroelectricity from the Bonneville Power Administration. It includes a renewable energy program that supports community solar projects, as well as electric vehicles.

Evan Ramsey, senior director of renewables for the foundation, said the project was a good fit.

"This was one way to get some of this clean technology into those communities," Ramsey said. "Certainly the prospects for electric tractors — reducing operating expenses, reducing health impacts for farmers and reducing emissions — those are all great outcomes, if we can realize them."

The project has also received backing from the U.S. Department of Agriculture, Alumbra Innovations Foundation, Pacific Power and Portland General Electric's Drive Change Fund.

Wallace, with the Wy'East Resource Conservation and Development Area Council, said he was brought on to be the boots on the ground, running the tractors and building interest among farmers.

The first two tractors were shipped to his home in 2021. Both came from the California manufacturer Solectrac — the 40-horsepower eUtility Electric Tractor and 30-horsepower Compact Electric Tractor.

Wallace fitted both models with data collection systems that use cellular and satellite connections to show where the tractors have been, what they were doing, how long they were able to do specific tasks and how much energy they used.

One of the challenges, Wallace said, is limitations with the battery packs. To make a battery large enough to power a 500-horsepower combine, like those seen in his neighbors' wheat fields, would not be cost-effective.

But for smaller farms, vineyards and orchards, Wallace said the electric tractors can do a lot.

"Overall, they can perform any job that an equivalent diesel tractor can perform," he said.

Field testing, charging

Dave Picanso, farm manager at Rusted Gate Farm in Central Point, said they hosted the electric tractors last spring to test drive in their apple and truffle orchards.

"When we first started using them, the first thing everybody noticed is how quick they are," Picanso said. "You can take off basically in any gear."

Rusted Gate Farm is a working farm and nonprofit organization in the Rogue Valley of southern Oregon. Part of the mission, Picanso said, is to support other small farms through demonstrations, trials and educational outreach.

Picanso said there was definitely a learning curve getting used to the electric tractors and how they handle. The tractors were too small to use working hay, he said. They were better suited for the orchards — mowing brush, moving mulch and running a rotary tiller between rows of trees.

The tractors charged overnight, and Picanso said they never had an issue running out of battery while out on a job.

"We ran it for three and a half to four hours pretty hard, and we would still have 30% (battery)," he said.

In Dufur, Wallace showed how the tractors can plug into any standard 220-volt outlet. It takes roughly three to four hours for the tractors to fully charge, while the battery life ranges from several hours to all day, depending on how hard they're working.

"It's a lot easier to charge these than even what we originally thought," Wallace said. "We don't need on-farm charging stations."

Wallace acknowledges there are limitations with the tractors' size and batteries. They can't do everything that commercial agriculture demands, he said, but trials like those at Rusted Gate prove they can be effective in certain operations.

"Now we've got things we can use, things we can see on the landscape," he said. "It's not going to fit every solution, and that's not what we're trying to do."

Earlier this month, Oregon State University published a study analyzing the cost of ownership for the Solectrac Compact Electric Tractor and 32-horsepower John Deere 2032R.

The study, conducted by Oregon State's Nexus of Energy, Water and Agriculture Lab, assumes both tractors operate 250 hours a year for seven years. The cost of ownership is divided into four segments: purchase price, financing costs, energy costs and maintenance and repair.

According to the study, the electric tractor produced substantially less greenhouse gas emissions — 1.56 metric tons versus 4.84 metric tons generated by the diesel tractor. The electric tractor's emissions were calculated based on the estimated emissions of generating the electricity it used.

Meanwhile, the cost of ownership was roughly equivalent, ranging from $39,853 to $40,738 for the electric tractor compared to $37,553 to $43,072 for the diesel tractor. The findings were based on data collected by Wallace.

Kyle Proctor, the study's author, wrote that eTractors "offer a great value proposition for farmers in the Pacific Northwest."

"The transition toward eTractors would support the country's goals of combating climate change, and because agriculture is one of the industries most vulnerable to climate change impacts, the transition to eTractors can serve as an act of self-preservation for agriculture," Proctor wrote.

More than 80% of the cost of ownership for the Solectrac Compact Electric Tractor is associated with the initial purchase price. The base price is listed at $27,999, or $33,797 if you add the front loader and industrial tires.

The base price for the diesel John Deere 2032R is $25,345, which includes industrial tires.

Deere and other manufacturers are also developing electric tractors and sprayers.

Callahan, with Sustainable Northwest, said the study is further underscored by the rising cost of diesel. The American Automobile Association reports the average price of diesel is currently $4.99 per gallon in Oregon, and $4.48 per gallon nationwide.

Average electricity prices in Oregon are lower than the national average, according to the U.S. Energy Information Administration, with about half all all generation hydro power.

Rates are 10.86 cents per kilowatt-hour for residential customers; 9.27 cents per kilowatt-hour for commercial customers; and 5.89 cents per kilowatt-hour for industrial customers.

"Energy is one of the few things (farmers) can control," Callahan said. "Electrifying their farm, being able to plug their tractor in at home and being able to completely remove all these other market forces provides a lot more stability, and really adds another layer of resilience to our farming community."

Growing interest

A separate report released simultaneously by the Cadeo Group in Portland examined the electric tractor market in the Pacific Northwest and barriers to adoption.

Electric tractors are still nascent in the U.S., according to the report, making up less than 1% of the total market share. Buyers now tend to be hobby farmers willing to assume greater risk to try less established technologies.

"The farm is not their primary source of income," the report states, "and therefore they are more willing to try a new technology based on other motivations such as carbon emission reduction without risking their long-term economic capability."

However, the report states that adoption of electric tractors could quickly increase due to recent technological improvements, cost reductions in development and manufacturers increasing production.

Based on their demonstrations and cost of ownership findings, Callahan said the project is growing in both scale and interest. Another two Solectrac Compact Electric Tractors were delivered earlier this month, which will be made available to farms for testing.

In March, U.S. Sen. Ron Wyden and U.S. Sen. Jeff Merkley, both Oregon Democrats, announced a $1.5 million allocation to the project, which will be used to add 12 new electric vehicles to the fleet.

"We're certainly eager to watch this program scale," Callahan said. "We just want to make sure this technology is accessible, and we think there are a lot of ways to do it."

Traci Brock, member services manager for the Wasco Electric Cooperative in The Dalles, said they will bring an electric tractor to demonstrate at their annual member appreciation picnic in June. The co-op serves roughly 5,000 square miles and 3,000 customers in rural Oregon.

"Farmers, as much as they want to say they don't want it, I think it intrigues them a little bit," Brock said. "It's one thing reading an article about it. It's another thing actually getting your hands on it."

Jamieson, the project manager at Forth Mobility, said electric tractors are only going to get better as the project moves forward.

"Once the market really starts to pick up over the next 2 to 3 years, I think we'll start to see pretty significant changes in this sphere," he said.